

Vast Distances Worksheet

$$1) \frac{1 \text{ ly}}{1} \left(\frac{9.46 \times 10^{15} \text{ m}}{1 \text{ ly}} \right) \left(\frac{1 \text{ km}}{1000 \text{ m}} \right)$$

$$\boxed{1 \text{ ly} = 9.46 \times 10^{12} \text{ km}}$$

$$\frac{1 \text{ pc}}{1} \left(\frac{3.26 \text{ ly}}{1 \text{ pc}} \right) \left(\frac{9.46 \times 10^{15} \text{ m}}{1 \text{ ly}} \right) \left(\frac{1 \text{ km}}{1000 \text{ m}} \right)$$

$$1 \text{ pc} = 3.08396 \times 10^{13} \text{ km}$$

$$\boxed{1 \text{ pc} \approx 3.08 \times 10^{13} \text{ km}}$$

$$2) t = ?$$

$$d = 2(8.1 \text{ pc}) = 16.2 \text{ pc}$$

$$v = 3.00 \times 10^8 \text{ m/s}$$

$$v = \frac{d}{t}$$

$$t = \frac{d}{v}$$

$$t = \frac{4.9960152 \times 10^{17} \text{ m}}{3.00 \times 10^8 \text{ m/s}}$$

$$t = 1665338400 \text{ s}$$

$$\boxed{t \approx 1.7 \times 10^9 \text{ s}}$$

$$t \approx 4.7 \times 10^5 \text{ h}$$

$$t \approx 19676 \text{ d}$$

$$t \approx 54 \text{ years!}$$

$$16.2 \text{ pc} \left(\frac{3.26 \text{ ly}}{1 \text{ pc}} \right) \left(\frac{9.46 \times 10^{15} \text{ m}}{1 \text{ ly}} \right)$$

$$d = 4.9960152 \times 10^{17} \text{ m}$$

$$3) d = ?$$

$$v = \frac{d}{t}$$

$$t = 1.25 \times 10^5 \text{ h}$$

$$= 4.50 \times 10^8 \text{ s}$$

$$d = v t$$

$$d = (3.00 \times 10^8 \text{ m/s})(4.50 \times 10^8 \text{ s})$$

$$v = 3.00 \times 10^8 \text{ m/s}$$

$$d = 1.35 \times 10^{17} \text{ m}$$

$$\text{Km: } \frac{1.35 \times 10^{17} \text{ m}}{1} \left(\frac{1 \text{ Km}}{1000 \text{ m}} \right) = \boxed{1.35 \times 10^{14} \text{ Km}}$$

$$\text{Pc: } \frac{1.35 \times 10^{17} \text{ m}}{1} \left(\frac{1 \text{ ly}}{9.46 \times 10^{15} \text{ m}} \right) \left(\frac{1 \text{ Pc}}{3.26 \text{ ly}} \right) = \boxed{4.38 \text{ Pc}}$$

$$\text{AU: } \frac{1.35 \times 10^{17} \text{ m}}{1} \left(\frac{1 \text{ AU}}{1.50 \times 10^{11} \text{ m}} \right) = 900000 \text{ AU} = \boxed{9.00 \times 10^5 \text{ AU}}$$

$$4) d = 5.79 \times 10^7 \text{ Km}$$

$$\frac{5.79 \times 10^7 \text{ Km}}{1} \left(\frac{1000 \text{ m}}{1 \text{ Km}} \right) \left(\frac{1 \text{ AU}}{1.50 \times 10^{11} \text{ m}} \right)$$

$$\boxed{0.386 \text{ AU}}$$

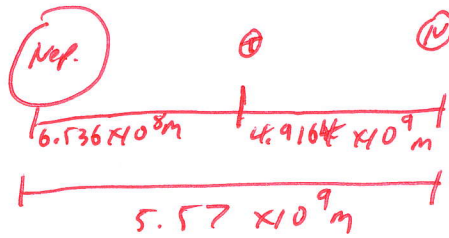
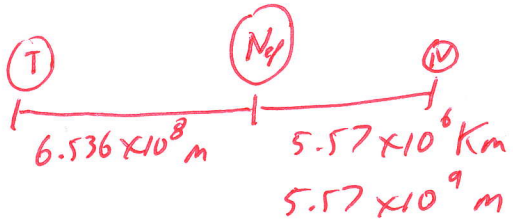
Vast Distances

#s 3-4

5)

Max

Min



$$t = ?$$

$$d = 6.2236 \times 10^9 \text{ m}$$

$$v = 3.00 \times 10^8 \text{ m/s}$$

$$v = \frac{d}{t} \quad t = \frac{d}{v}$$

$$t = \frac{6.2236 \times 10^9 \text{ m}}{3.00 \times 10^8 \text{ m/s}}$$

$$t = 20.7453 \text{ s}$$

$$t \approx 20.7 \text{ s}$$

$$t = ?$$

$$d = \cancel{5.57 \times 10^9 \text{ m}} \quad 4.9164 \times 10^9 \text{ m}$$

$$v = 3.00 \times 10^8 \text{ m/s}$$

$$v = \frac{d}{t} \quad t = \frac{d}{v}$$

$$t = \frac{\cancel{5.57 \times 10^9 \text{ m}} \quad 4.9164 \times 10^9 \text{ m}}{3.00 \times 10^8 \text{ m/s}}$$

$$t \approx 18.50 \text{ s}$$

$$t = 16.388 \text{ s}$$

$$t \approx 16.4 \text{ s}$$

$$6) d = 107 \text{ ly}$$

$$\cancel{107 \text{ ly} \quad (9.46 \times 10^{15} \text{ m}) \quad (1 \text{ pc})}$$

$$\frac{107 \text{ ly}}{1} \left(\frac{1 \text{ pc}}{3.26 \text{ ly}} \right)$$

$$32.8 \text{ pc}$$

Vast Distances

#s 5-6

$$7) d = 8.74 \text{ pc}$$

$$v = 3.00 \times 10^8 \text{ m/s}$$

$$t = ?$$

$$\frac{8.74 \text{ pc}}{1} \left(\frac{3.26 \text{ ly}}{1 \text{ pc}} \right) \left(\frac{9.46 \times 10^{15} \text{ m}}{1 \text{ ly}} \right)$$

$$d = 2.69538104 \times 10^{17} \text{ m}$$

~~$$d = 2.70 \times 10^{17} \text{ m}$$~~

$$v = \frac{d}{t}$$

$$t = \frac{d}{v}$$

$$t = \frac{2.69538104 \times 10^{17} \text{ m}}{3.00 \times 10^8 \text{ m/s}}$$

$$t = 898460346.7 \text{ s}$$

$$t \approx 8.98 \times 10^8 \text{ s}$$

Years:

$$\frac{898460346.7 \text{ s}}{1} \left(\frac{1 \text{ h}}{3600 \text{ s}} \right) \left(\frac{1 \text{ day}}{24 \text{ h}} \right) \left(\frac{1 \text{ yr}}{365.25 \text{ days}} \right)$$

$$\approx 28.5 \text{ years}$$

or

$$\frac{8.74 \text{ pc}}{1} \left(\frac{3.26 \text{ ly}}{1 \text{ pc}} \right) \approx 28.5 \text{ years}$$

and then convert to seconds...

would take 28.5 years to reach us